# Novel method to prepare multiwalled carbon nanotube/poly(dimethyl siloxane) (MWCNT/PDMS) non-conducting composites

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# Novel method to prepare multiwalled carbon nanotube/poly(dimethyl siloxane) (MWCNT/PDMS) non-conducting composites

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In this study a new method of carbon nanotube (CNT) incorporation was employed for the preparation of ultraviolet (UV) curable CNT filled poly (dimethyl siloxane) (PDMS) composites. The composites were designed to contain loadings of CNT above the percolation threshold without becoming conductive due to a localized distribution of CNT. Ultrasonicated and dispersed multiwalled CNTs were mixed with short chain α,ω- vinyl terminated PDMS. When the whole mixture containing dispersed CNT and short chain PDMS was irradiated with UV radiation in presence of deficient amount of hexa functional thiol PDMS crosslinker and a photoinitiator, hyperbranced PDMS layer was formed over the CNTs. The prepared hyperbranched CNTs were mixed in different weight ratios (0.33%, 0.66%, 1%) with long chain α,ω- vinyl terminated PDMS and crosslinked subsequently with the same hexa functional thiol PDMS via UV photoinitiated thiol-ene chemistry to obtain the networks. Rheology of the prepared networks showed a gradual decrease in storage modulus (G') in the entire frequency range as the amount of CNT was increased due to a reduction in crosslinking density imposed by the CNTs. Dielectric spectroscopy measurements showed an increasing trend in permittivity in all the composites with increasing CNT loadings and AC conductivity measurements confirmed non-percolating behavior of the prepared composites.